Biological Energy Transduction: the Uroboros

Edited by R.F. Fox

Wiley-Interscience; New York, 1982
viii + 280 pages. £24.50

An 'uroboros' turns out to be a self-assembling system. This is a most unusual book. It consists of three largely independent sections dealing respectively with thermodynamics, energy transduction and 'origins and evolution'. In the Introduction the author warns that 'some readers will find Part 1 (biochemical thermodynamics) difficult'. This is an understatement, since it will be incomprehensible to anyone who lacks a first degree in physics or physical chemistry. This is disappointing to an average bioenergeticist such as the reviewer, since there is a great need for an authoritative but simple introduction to biochemical thermodynamics.

The second section (energy transduction in organisms) contains quite a readable account of biosynthetic processes, including just 35 pages on Chemiosmosis. However, the choice of material, the relative lack of biochemical references (many of which refer to classic student textbooks such as Mahler and Cordes, Baldwin, Conn and Stumpf, Lehninger, Metzler and Stryer) and somewhat embarrassing statements such as 'while the work of Mitchell has provided the general setting for the (chemiosmotic) material to be presented... the very recent work of (one laboratory) has provided most of the specific details...' suggest that the author is not entirely fluent with the breadth of the bioenergetics literature.

In the final section (40 pages) the author speculates on the origin of life, and in particular possible schemes for the development of bioenergetic systems and gene-directed protein synthesis. This is the most successful part of the book, and provides entertaining reading.

While I cannot agree with the blurb on the flysheet recommending this book for students of medicine, biochemistry and molecular and cellular biology (all of whom would panic at the first sight of a quantum mechanical partition function) it could serve as an introduction for physical scientists. If the author were to simplify the thermodynamic section, and provide a more catholic treatment of bioenergetics, a second edition could also have a wide readership among these former categories of students.

David Nicholls

Genetic Takeover and the Mineral Origins of Life

by A.G. Cairns-Smith

Cambridge University Press; London, New York, 1982
x + 478 pages. £15.00

This controversial book (also reviewed in Nature 300, 127 and New Scientist 96, 453) is among the most stimulating ones I have ever read on the subject of the origins of life.

Current orthodoxy relies on a 'principle of continuity' in evolution, and views the first organisms as rough sketches of contemporary life. But for Cairns-Smith, evolution is revolution, and proceeds through a series of takeovers. Primitive life might have been based upon replicating clays, and an inorganic metabolism. At one stage, some 'evolved primary organisms started to make organic molecules through photosynthesis. This led to organisms that had both inorganic and